

### REMARKS

Reconsideration and allowance of this application, as amended, are respectfully requested.

Claims 1-20 were rejected under 35 USC 103 as being unpatentable over Imabayashi et al. (US Patent 6,535,264) in view of Nishiyama et al (US Patent No. 6,507,385). This ground of rejection is respectfully traversed. Claims 1, 9 and 15 are amended and are believed to patentably define over the references, taken singly or in combination.

In amended claims 1, 9 and 15, the added limitation "volume expansion coefficient of the liquid crystal material falls within a range of  $0.65 \times 10^{-3} \text{ }^{\circ}\text{C}^{-1}$  to  $0.85 \times 10^{-3} \text{ }^{\circ}\text{C}^{-1}$  is supported by the description of lines 3-6 of page 7 of the specification.

Further in claims 1, 9 and 15, the added limitation that "the liquid crystal panel is free from granular spacers" is supported by FIG. 2 and the description from page 1, line 24, to page 2, line 2, of the specification.

New claims 21 and 22 are supported by the description on lines 8-10 of page 18 of the specification.

In a liquid crystal display module whose liquid crystal display panel is stood during use of the module, granular spacers are usually not used, instead, only columnar spacers are used. A conventional liquid crystal display module having such a structure is likely to lose in-plane uniformity of cell gaps because of thermal expansion of the liquid crystal material or the effect of gravity on the liquid crystal material.

Amended claims 1, 9 and 15 define the elasticity of columnar spacers and the volume expansion coefficient of a liquid crystal material. Control of these factors makes it possible to prevent impairment of in-plane uniformity of the cell gaps by the thermal expansion of the liquid crystal material and the effect of gravity on the liquid crystal material.

In short, according to the inventions set forth in claims 1, 9 and 15, the mentioned advantages are not obtained by the elasticity of the columnar spacers alone, but by the combination of the elasticity of the columnar spacers and the volume expansion coefficient of the liquid crystal material.

Imabayashi et al. uses both a columnar spacer (spacer SOC) and a granular spacer (bead BZ) whose diameter is greater than that of the columnar spacer. In other words,

Imabayashi et al. is not related to a liquid crystal display module which uses only columnar spacers.

Further, Imabayashi et al. discloses in column 7, lines 36--50, that the granular spacer is compressed to deform when one substrate is stuck to another. This allows the granular spacer to maintain contact with one of the substrates even if the cell gap is enlarged and the columnar spacer is separated from a substrate because of thermal expansion of the liquid crystal, as mentioned on lines 51--63 of column 7. Thus, in the liquid crystal display module of Imabayashi et al., the columnar spacer is separated from one of the substrates when the cell gap is enlarged.

Moreover, Imabayashi et al. does not disclose thermal expansion of a liquid crystal material.

Nishiyami et al. does not even disclose that the liquid crystal display module is used in a state where its liquid crystal display panel is arranged vertically.

Further, Nishiyama et al. does not disclose thermal expansion of the liquid crystal material.

Thus, Imabayashi et al. has little to do with our claims 1, 9 and 15 inventions. Imabayashi et al. and Nishiyama et al. do not mention thermal expansion of the liquid crystal material. Nishiyama et al. does not even mention using a liquid crystal display module with its liquid crystal panel arranged vertically.

In sum, Imabayashi et al. and Nishiyama et al. do not disclose or suggest solving the problems unique to a liquid crystal display module whose liquid crystal display panel is made to stand during use of the module by the combination of the elasticity of columnar spacers and the volume expansion coefficient of the liquid crystal material.


Therefore, it is clear that amended claims 1, 9 and 15 and claims 2-8, 10-14 and 16-22, dependent from claims 1, 9 and 15, define combinations not suggested by the Imabayashi et al. and Nishiyama et al. references, taken singly or in combination.

In light of the above, our claimed inventions are patentably distinct from the references, taken singly or in combination. In fact, there is no suggestions within either of the references that it would be appropriate to combine its teachings with those of the other reference.

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Reply to Final Office Action of May 6, 2003

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,  
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